

<b>SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT</b>	Page 1 of 7 pages
<b>ENGINEERING &amp; COMPLIANCE</b>	Appl. Nos.: 404240
<b>APPLICATION PROCESSING AND CALCULATIONS</b>	Processed by: Ngoc Tran
	Checked by:
	Date: 5/8/13

**PERMITS TO OPERATE (PO no PC) for**  
**SUMP WITH CONTROL (CARBON ADSORBER), AN 404240**  
**for SPENT H2SO4 pH ADJUSTMENT**

**COMPANY NAME:** BP West Coast Products LLC  
**COMPANY ID:** 131003  
**MAILING ADDRESS:** P.O. Box 6210  
Carson, CA 90749  
**EQUIPMENT LOCATION:** 1801 E Sepulveda Blvd.  
Carson, CA 90745

**EQUIPMENT DESCRIPTION:**  
**SECTION D:**

Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions * And Requirements	Conditions
<b>Process 9: ALKYLATION AND POLYMERIZATION</b>					
<b>System 11: SUMP, COVERED AND CONTROLLED, SPENT ACID pH ADJUSTMENT</b>					S13.12, S13.13x
SUMP, SPENT H2SO4 & STORM/WASHDOWN WATER, LOCATED AT ALKYLATION UNIT, RW 3904-271.02, COVERED, 8195 GALLONS, W: 7 FT 2 IN; L: 14 FT 6 IN; D: 10 FT 6.5 IN, WITH TWO COMPARTMENTS: ONE FOR pH ADJUSTMENT WITH A MIXER & ONE FOR STORM/WASHDOWN WATER COLLECTION A/N: 404240	<u>DX1</u>	<u>CX2</u>		VOC: 500 PPMV (5) [RULE 1176, 9-13-1996]; VOC: 500 PPMV (8) [40CFR 60 Subpart QQQ, 10-17-2000]; VOC: 500 PPMV (4) [RULE 1303(a)-BACT, 5-10-1996]	
CARBON ADSORBER, ACTIVATED CARBON, 2 IN SERIES, 1000 LBS EACH A/N: 404240	<u>CX2</u>	<u>DX1</u>			D90.22x, E128.3, E153.9x,

**BACKGROUND:**

The relevant permitting history of the sump is summarized below:

- 5/29/02: A Notice to Comply (NTC #61527) was issued to BP to comply with permit requirement for this sump located in the alkylation unit (**Attachment 1**).
- 7/18/02: BP submitted an application (AN 404240) for two sumps located at the alkylation unit and the tank farm area. Fee of \$5160.00 was submitted (fee Schedule E and 50% penalty: \$3440.00 x 1.5 = \$5160.00).
- 4/9/03: BP submitted another application (AN 418721) to install two carbon adsorbers serving the sump located at the alkylation unit. This application was cancelled on 9/30/08, as per BP's request in a letter dated 8/6/03, since the carbon adsorbers were already installed (**Attachment 2** – Note that AN 414220 referenced in this letter was a typo, which should be 418721 instead).

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2/28/13: BP submitted an application (AN 547751) for the sump located at the tank farm area since it's treated as a separate permit unit. There is no control equipment serving the tank farm sump.

This PO no PC evaluation is conducted for AN 404240, a covered sump located at the alkylation unit venting to two in-series carbon adsorbers.

#### **ENFORCEMENT RECORD REVIEW:**

There is no NTC/NOV issued to BP related to the controlled sump located in the alkylation unit in the past two years. As mentioned in the background section, an NTC (NTC #61527 dated 5/29/12) was issued to BP for operating the sump without a permit.

#### **PROCESS DESCRIPTION:**

Sump: This existing sump located at the alkylation unit has been using to receive, store, and treat the spent sulfuric acid. Specifically, the acidic solution accumulated in this sump is converted to the alkaline solution utilizing the liquid sodium hydroxide. The sump contains two compartments (one is for pH adjustment and the other one is used as a storm/washdown water overflow basin) and is equipped with a fixed cover, a flame arrestor, a liquid level indicator, and a pH level indicator. The pH adjustment compartment is also equipped with a 1-HP mixer. The sump is vented to a two in-series carbon canister, 1000 lb capacity each.

The influent streams' pH level is between 1 to less than 7 and after being adjusted, the pH level will be from 7 up to 12. The caustic solution is added to the sump based on the liquid level and pH level measurements. No fuming is expected during the adjustment/mixing period. After being adjusted, the effluent streams are routed to the oily water sewage, which is sent to the refinery wastewater treatment system. The treated wastewater is discharged into the Los Angeles County Sanitation District. Occasionally, the sump can be served as an overflow basin for storm or washdown water overflow.

In the permit application, the sump is called "neutralization" sump. However, the final treatment/adjustment pH can be up to 12. As per BP's records (email dated April 3, 2013 - Attachment 3), the pH has not been exceeded 12.5 year-to-date. As such, it's more appropriate to rename the function of the sump to "pH adjustment." At 12.5 and higher, the spent solution is considered carrying the corrosivity characteristic of a hazardous material as per the 40CFR 261.22 definition as follows:

H:\NgocTran BP Dec2012\CorrosivityCharacSump 547751 404240 CFR-2010-title40-vol25-sec261-22.pdf

#### **§ 261.22 Characteristic of corrosivity.**

(a) A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:

(1) It is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5, as determined by a pH meter using Method 9040C in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW-846, as incorporated by reference in § 60.11 of this chapter. (2) It is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35 mm (0.250 inch) per year at a test temperature of 55 °C (130 °F) as determined by Method

(nt/sump spt H2SO4 pH adjustment w/ control carbon ads404240 & w/o control 547751 po NO pc\_SR1\_final.doc)

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1110A in “Test Methods for Evaluating Solid Waste, Physical/ Chemical Methods,” EPA Publication SW-846, and as incorporated by reference in § 260.11 of this chapter.

(b) A solid waste that exhibits the characteristic of corrosivity has the EPA Hazardous Waste Number of D002.

[45 FR 33119, May 19, 1980, as amended at 46 FR 35247, July 7, 1981; 55 FR 22684, June 1, 1990; 58 FR 46049,

As per the P&ID (Drawing #8611-11100925, Revision 11 dated 4/2013, Attachment 4), the spent acid, contaminated with hydrocarbon, is generated normally from the four acid sampling stations and the alkylation unit’s contactors during the unit turnaround. The sump also receives the wash water from the drain boxes and catch basin as overflow. The sump’s influent and effluent are summarized below:

*Spent acid  
& overflow  
storm/washdown H2O* → sump → refinery oil sewer → refinery ww treatment system → treated ww → LACSD

Carbon Adsorbers: Two in-series carbon adsorbers, 1000 lb each, are utilized as the control device for the sump to reduce VOC emissions. The control efficiency is expected at 95% or greater for VOC. The primary and secondary carbon canisters are operate in series. Breakthrough is defined a VOC reading of 500 ppmv measured at the exit of the primary canister.

BP monitors both canisters for breakthrough twice per week. When a breakthrough occurs, BP will replace the entire primary carbon bed (carbon and its container) with the fresh carbon bed within 24 hours. The original secondary carbon bed may then become the new primary carbon bed. The spent carbon is regenerated offsite.

### **EMISSION CALCULATIONS:**

The spent acid may contain as much as 10% VOC as per the attached MSDS (Attachment 5). The VOC emissions occur during the sump filling operations as filling loss. During the mixing with caustic solution, the emission is presumed to be insignificant.

### VOC emissions:

- Uncontrolled emissions as filling loss is calculated for spent acid storage utilizing EPA Tank 4.09 program with the following operating parameters:

Thruput = 8195 gal/d max = 350 TO/yr (assuming VOC vapors come from both compartments and mixer is on)

VP = 1.0 psia as worst case scenario (MSDS shows a vapor pressure of only 0.006 psia)

Density = 14.19 lb/gal

Uncontrolled VOC = 1689.08 lb/yr (Attachment 6)  
= 4.63 lb/d

Controlled VOC = 4.63 lb/d x 5% = 0.23 lb/d

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- Controlled emission rate is 0.23 lb/day calculated with 95% VOC control efficiency. *(The 95 to 98% control efficiency is typical for an activated carbon adsorption system as discussed on Page 16 of EPA May 1999 Technical Bulletin (EPA 456/F-99-004), "Choosing an Adsorption System for VOC: Carbon, Zeolite, or Polymers?" )*

Carbon adsorption - Carbon life: Carbon life is calculated with the capacity of 20% (100 lb fresh carbon adsorbs 20 lb HC) and presented in the table below.

<b>Carbon Life, Days:</b>	
Carbon size:	1000 lb/canister
Carbon capacity:	20 %
Adsorption capacity:	200 lb VOC/canister(20x400/100)
Uncon. Emis./sump:	4.63 lb/day@1.0 psi VP
<b>Carbon life:</b>	<b>43</b> day

Based on BP's 2012 monitoring records, the breakthrough periods are as follows:

<b>Date of breakthrough</b>	<b>Actual carbon life</b>	<b>Remarks</b>
1/23/12		
2/27/12	34	
3/29/12	32	
7/12/12	103	Data is not used for carbon life average
9/17/12	65	
10/1/12	14	
11/16/12	45	
11/29/12	13	

Using the 34 days average carbon life, the uncontrolled emission would be 2.42 lb/day (compared to the 43 days carbon life and 4.63 lb/d uncontrolled emissions from EPA's Tank 4.09 program). This forms the basis for imposing the monitoring Conditions D90.22x and E153.9x. The monitoring of the breakthrough between the primary and secondary carbon canisters is conducted twice per week when there is actual flow to the carbon canister (at sump filling period).

#### **RULE EVALUATION:**

Rule 212: R212(c)(1):

The equipment is not located within 1000 feet from the boundary of a school. Therefore, public notice required under R212(c)(1) does not apply.

R212(c)(2):

The sump for pH adjustment does not result in an emission increase exceeding any of the daily limits specified under R212(g). Therefore, public notice required under R212(c)(2) does not apply.

R212(c)(3):

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The sump for pH adjustment does not result in an toxic emission increase. Therefore, public notice required under R212(c)(3) does not apply.

R212(g):

The sump for pH adjustment of this RECLAIM facility does not result in an emission increase exceeding any of the daily limits specified under R212(g). Therefore, public notice required under R212(g) does not apply.

Rule 401: With proper operation and maintenance of the pH adjustment in the sump, opacity is not expected.

Rule 402: Nuisance is not expected under normal operating conditions.

Regulation IX – New Source Performance Standards (NSPS):

**40CFR60 Subpart QQQ – Petroleum Refinery Wastewater Systems:** The sump is subject to this subpart and in compliance with the 500 ppmv limit. Condition S13.13x is imposed and tagged to this system (System 11 of Process 9).

Rule 1176: The sump handling spent acid is subject to R1176 as its effluent is sent to the refinery wastewater treatment system prior to routing to the LACSD. Compliance with the 500 ppm VOC limit and other rule requirements is expected.

Reg. XIII – New Source Review:

BACT: The sump is connected to the vapor control system to capture and control VOC emissions. BACT requirement is set at 500 ppmv for VOC.

Offset: Since the controlled emission from the sump is less than 1 pound per day, offset is not required.

RULE 1401: No toxic air contaminants are expected emitted from this sump. Sulfuric acid received by the sump is converted into a salt through a reaction with sodium hydroxide. R1401 does not apply.

Reg XVII: Regulation XVII: Prevention of Significant Deterioration (PSD) Requirements Standard Prepared Statement by the District

Limited Authority: Effective July 25, 2007, the District was granted a limited delegation authority from the EPA (excluding PSD project). This sump emits only VOC emissions, which are not an attainment pollutant for the South Coast basin. Therefore, they are not subject to this regulation.

Reg XXX Title V Permit R3005 – “Permit Revision”:

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The initial Title V permit was issued to BP on September 1, 2009. The proposed revision to BP's Title V permit for a PO no PC sump venting to the carbon canisters is a De minimis Significant Revision pursuant to R3005(e). A 45-day EPA review is required, but the proposed revision does not require a public notification under R3006(b).

### CONCLUSIONS/RECOMMENDATIONS:

The sump located at the Alkylation unit and associated air pollution control equipment are expected to comply with all applicable rules and regulations. Therefore, permits to operate (PO no PC) is recommended subject to the following conditions:

AN	Process/System/Equipment	Process Conditions	System Conditions	Device Conditions
404240	P9 S11 Sump, Covered & Controlled, Spent Acid pH Adjustment	None	S13.12, <u>S13.13x</u>	Cx2: <u>D90.22x</u> , E128.3, <u>E153.9x</u>

### SYSTEM CONDITIONS

S13.12 All devices under this system are subject to the applicable requirements of the following rules or regulations:

Contaminant	Rule	Rule/Subpart
VOC	District Rule	1176

#### [RULE 1176, 9-13-1996]

[Systems subject to this condition: Process 9, System 11; Process 12, System 16, 17]

S13.13x All devices under this system are subject to the applicable requirements of the following rules or regulations:

Contaminant	Rule	Rule/Subpart
VOC	40CFR60, SUBPART	QQQ

#### [40CFR 60 Subpart QQQ, 10-17-2000]

[Systems subject to this condition: Process 9, System 11]

D90.22x The operator shall periodically monitor the VOC concentration at the outlet of the first carbon canister and at the exit to the atmosphere according to the following specifications:

The operator shall use EPA Reference Method 21 to monitor the parameter.

The operator shall calibrate the instrument used to monitor the parameter in ppmv methane.

Alternately, the operator may use the District Grab Sample Method, as specified in Rule 1176, to measure the VOC concentration.

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The operator shall monitor twice every week. Monitoring shall be conducted when there is actual flow to the carbon canister (at sump filling period) unless no filling is expected to occur before the next required monitor

[**RULE 1176, 9-13-1996; RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(b)(2)-Offset, 5-10-1996**]  
[Devices subject to this condition: Cx2]

E128.3 The operator shall keep all spent carbon in a tightly covered container which shall remain closed except when it is being transferred into or out of the container.

[**RULE 1401, 9-10-2010**]  
[Devices subject to this condition: C2910, Cx2]

E153.9x The operator shall change over the spent carbon with activated carbon, **within 24 hours**, in the adsorber whenever breakthrough occurs.

For the purpose of this condition, breakthrough occurs when the hydrocarbon monitor reading indicates a concentration of 500 ppmv at the outlet of the first canister. If breakthrough occurs, the spent carbon adsorber shall either be replaced with an identical unit containing fresh activated carbon or the spent carbon shall be removed and replaced with fresh activated carbon.

To replace the carbon adsorber, the operator shall remove the first carbon canister, replace it with a fresh carbon adsorber or rotate the second adsorber in series to first, and put in a new second carbon adsorber.

[**RULE 1176, 9-13-1996; RULE 1303(a)(1)-BACT, 5-10-1996; RULE 1303(b)(2)-Offset, 5-10-1996**]  
[Devices subject to this condition: Cx2]